

CLAIMS

What is claimed is:

- 1 1. A method for determining the spacing of objects, the method comprising the steps
2 of:
3 receiving data that defines a constraint;
4 receiving a set of spacing parameter values that indicate how to space objects
5 across said constraint; and
6 generating a set of points for spacing objects across said constraint based on a
7 bound of at least one dimension of said constraint and said set of spacing
8 parameter values.
- 1 2. The method of Claim 1, wherein the step of generating a set of points for spacing
2 objects across said constraint further comprises the steps of:
3 selecting a grid type from a plurality of grid types, wherein the grid type is
4 associated with one or more grid attributes; and
5 mapping a grid of said selected grid type onto said constraint.
- 1 3. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting the grid type based on the set of received spacing parameter values.
- 1 4. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting the grid type based on the defined constraint.
- 1 5. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting the grid type based on user input that specifies a particular type of grid
3 that is to be used.
- 1 6. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting the grid type based on the set of spacing parameter values and the
3 defined constraint.

- 1 7. The method of Claim 2, wherein the step of mapping a grid of said selected grid
2 type onto said constraint includes the steps of:
3 generating a set of grid points based on attributes of said selected grid type; and
4 translating said set of grid points onto said constraint.
- 1 8. The method of Claim 1, further comprising the step of receiving input that
2 specifies one or more attributes of said constraint, wherein said one or more
3 attributes are associated with one or more bounds of one or more dimensions of
4 said constraint.
- 1 9. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a one-dimensional
3 constraint.
- 1 10. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a multi-dimensional
3 constraint.
- 1 11. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a spline constraint.
- 1 12. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a sphere constraint.
- 1 13. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a cylinder constraint.
- 1 14. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a rectangle constraint.
- 1 15. The method of Claim 1, wherein the step of receiving data that defines a
2 constraint includes the step of receiving data that defines a line segment
3 constraint.
- 1 16. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a two-dimensional grid type.

- 1 17. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a three-dimensional grid type.
- 1 18. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a rectangular grid type.
- 1 19. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a polar grid type.
- 1 20. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a hex grid type.
- 1 21. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a triangular mesh grid type.
- 1 22. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a spherical grid type.
- 1 23. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a random grid type.
- 1 24. The method of Claim 2, wherein the step of selecting a grid type includes the step
2 of selecting a scattered grid type.
- 1 25. The method of Claim 1, further comprising the step of receiving a set of object
2 information, wherein the set of object information identifies a particular object to
3 be placed on the constraint at locations based on said generated set of points.
- 1 26. The method of Claim 25, wherein the step of generating the set of grid points
2 includes the steps of generating the set of grid points based on the set of object
3 information.
- 1 27. The method of Claim 26, wherein:
2 the set of object information identifies a bounding box that is associated with the
3 particular object; and

4 the step of generating the set of grid points based on the set of object information
5 comprises the step of generating the set of grid points based the bounding
6 box.

1 28. The method of Claim 2, wherein the step of mapping a grid of said selected grid
2 type onto said constraint includes the step of determining one or more locations to
3 place objects on said constraint by identifying one or more areas of said grid that
4 intersect said constraint.

1 29. The method of Claim 28, further comprising the step of:
2 receiving pivot point information, wherein the pivot point information specifies
3 pivot points for the placement of objects relative to the generated set of
4 points; and
5 placing objects on said constraint such that the pivot points of said objects
6 coincide with said one or more locations.

1 30. The method of Claim 28, further comprises the steps of:
2 identifying a particular object;
3 generating a copy of said particular object; and
4 placing the copy of said particular object at one or more of said one or more
5 locations.

1 31. The method of Claim 28, further comprises the steps of:
2 identifying a particular object;
3 generating an instance of said particular object; and
4 placing the instance of said particular object at one or more of said one or more
5 locations.

1 32. A computer-readable medium carrying one or more sequences of instructions for
2 determining the spacing of objects, wherein execution of the one or more
3 sequences of instructions by one or more processors causes the one or more
4 processors to perform the steps of:

5 receiving data that defines a constraint;
6 receiving a set of spacing parameter values that indicate how to space objects
7 across said constraint; and
8 generating a set of points for spacing objects across said constraint based on a
9 bound of at least one dimension of said constraint and said set of spacing
10 parameter values.

1 33. The computer-readable medium of Claim 32, wherein the step of generating a set
2 of points for spacing objects across said constraint further comprises the steps of:
3 selecting a grid type from a plurality of grid types, wherein the grid type is
4 associated with one or more grid attributes; and
5 mapping a grid of said selected grid type onto said constraint.

1 34. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting the grid type based on the set of received
3 spacing parameter values.

1 35. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting the grid type based on the defined constraint.

1 36. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting the grid type based on user input that specifies a
3 particular type of grid that is to be used.

1 37. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting the grid type based on the set of spacing
3 parameter values and the defined constraint.

1 38. The computer-readable medium of Claim 33, wherein the step of mapping a grid
2 of said selected grid type onto said constraint includes the steps of:
3 generating a set of grid points based on attributes of said selected grid type; and
4 translating said set of grid points onto said constraint.

- 1 39. The computer-readable medium of Claim 32, further comprising instructions for
2 performing the step of receiving input that specifies one or more attributes of said
3 constraint, wherein said one or more attributes are associated with one or more
4 bounds of one or more dimensions of said constraint.
- 1 40. The computer-readable medium of Claim 32, wherein the step of receiving data
2 that defines a constraint includes the step of receiving data that defines a one-
3 dimensional constraint.
- 1 41. The computer-readable medium of Claim 32, wherein the step of receiving data
2 that defines a constraint includes the step of receiving data that defines a multi-
3 dimensional constraint.
- 1 42. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting a two-dimensional grid type.
- 1 43. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting a three-dimensional grid type.
- 1 44. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting a rectangular grid type.
- 1 45. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting a polar grid type.
- 1 46. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting a triangular mesh grid type.
- 1 47. The computer-readable medium of Claim 33, wherein the step of selecting a grid
2 type includes the step of selecting a spherical grid type.
- 1 48. The computer-readable medium of Claim 32, further comprising instructions for
2 performing the step of receiving a set of object information, wherein the set of
3 object information identifies a particular object to be placed on the constraint at
4 locations based on said generated set of points.

1 49. The computer-readable medium of Claim 48, wherein the step of generating the
2 set of grid points includes the steps of generating the set of grid points based on
3 the set of object information.

1 50. The computer-readable medium of Claim 49, wherein:
2 the set of object information identifies a bounding box that is associated with the
3 particular object; and
4 the step of generating the set of grid points based on the set of object information
5 comprises the step of generating the set of grid points based the bounding
6 box.

1 51. The computer-readable medium of Claim 33, wherein the step of mapping a grid
2 of said selected grid type onto said constraint includes the step of determining one
3 or more locations to place objects on said constraint by identifying one or more
4 areas of said grid that intersect said constraint.

1 52. The computer-readable medium of Claim 51, further comprising instructions for
2 performing the step of:
3 receiving pivot point information, wherein the pivot point information specifies
4 pivot points for the placement of objects relative to the generated set of
5 points; and
6 placing objects on said constraint such that the pivot points of said objects
7 coincide with said one or more locations.

1 53. The computer-readable medium of Claim 51, further comprising instructions for
2 performing the steps of:
3 identifying a particular object;
4 generating a copy of said particular object; and
5 placing the copy of said particular object at one or more of said one or more
6 locations.

1 54. The computer-readable medium of Claim 51, further comprising instructions for
2 performing the steps of:
3 identifying a particular object;
4 generating an instance of said particular object; and
5 placing the instance of said particular object at one or more of said one or more
6 locations.

1 55. A computer system for determining the spacing of objects, the system comprising:
2 a memory;
3 one or more processors coupled to the memory; and
4 a set of computer instructions contained in the memory, the set of computer
5 instruction including computer instructions which when executed by the
6 one or more processors, cause the one or more processors to perform the
7 steps of:
8 receiving data that defines a constraint;
9 receiving a set of spacing parameter values that indicate how to space
10 objects across said constraint; and
11 generating a set of points for spacing objects across said constraint based
12 on a bound of at least one dimension of said constraint and said set
13 of spacing parameter values.

1 56. The computer system of Claim 55, wherein the step of generating a set of points
2 for spacing objects across said constraint further comprising instructions for
3 performing the steps of:
4 selecting a grid type from a plurality of grid types, wherein the grid type is
5 associated with one or more grid attributes; and
6 mapping a grid of said selected grid type onto said constraint.
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1 57. A computer system for determining the spacing of objects, the system comprising:

2 means for receiving data that defines a constraint;
3 means for receiving a set of spacing parameter values that indicate how to space
4 objects across said constraint; and
5 means for generating a set of points for spacing objects across said constraint
6 based on a bound of at least one dimension of said constraint and said set
7 of spacing parameter values.

1 58. The computer system of Claim 57, wherein the step of generating a set of points
2 for spacing objects across said constraint further comprising:
3 means for selecting a grid type from a plurality of grid types, wherein the grid type
4 is associated with one or more grid attributes; and
5 means for mapping a grid of said selected grid type onto said constraint.